

[031] Observing Figs 3a-b and 4a-b, the relief surface 25 also is usually provided with a longer radial length  $\ell'$  than a radial length  $\ell''$  of the ridge surface 21 as seen in Fig. 3a, and is also longitudinally, i.e., axially spaced from the top surface 13 and cutting edge 15 of the die 3 a distance  $h'$  relative to the die height  $h$  as seen in Fig 4a. In addition, as shown in Fig. 4a, the relief surface 25 is generally formed higher on the wall of the die bore 11 than the ridge 19 and ridge surface 21, in other words, the downward facing relief surface 25 is longitudinally or axially positioned between the cutting edge 15 of the die 3, and the slug tipping ridge surface 21 to permit the top edge portion 33 of the slug 17 to tip from the horizontal and not jam against the inner wall of the die bore 11. The ridge 19 is longitudinally spaced from the top surface 13 and cutting edge 15 of the die 3 a distance  $h''$  and extends partially around the circumference of the wall of the die bore 11.

[032] Another way of defining the die bore 11 of the present invention is that the die bore 11 itself is composed of a top bore 27 and an offset bottom bore 29. The top bore 27 extends down from the top surface 13 of the die 3 the distance  $h''$ , and the bottom bore 29 extends upwards from the bottom surface [[14]] of the die 3 to the distance  $h'$  from the top surface 27. As can be seen in Fig. 4a-b, this results in a degree of overlap  $O$  of the top bore 27 and bottom bore 29. It is to be appreciated that this overlap  $O$  in combination with an offset  $O'$  as defined by the offset center axis  $X$  of bottom bore 29, to be discussed in further detail below, produce the ridge surface 21 and relief surface 25 discussed above.

1. (CURRENTLY AMENDED) A punch and die tooling apparatus comprising:
  - a punch and a die for forming a hole in a metal plate;
  - a die body defining a vertical through bore extending between a top and a bottom surface of the die body;
    - a horizontally extending ridge formed on a first portion of a wall of the through bore for engaging a portion of a slug cut from the metal plate and tipping the slug away from a face of the punch;
    - a partially circumferential relief formed on a second portion of the wall substantially opposite from the horizontally extending ridge to facilitate the tipping of the slug away from the face of the punch

wherein the partially circumferential relief is formed vertically closer to the top surface of the die body than the horizontally extending ridge to provide an adequate space to prevent jamming of the tipping slug in the through bore of the die.
2. (CANCELED)
3. (PREVIOUSLY PRESENTED) The punch and die tooling apparatus as set forth in claim 1, wherein the partially circumferential relief defines a relief area extending between the circumferential relief and the bottom surface of the die body.
4. (PREVIOUSLY PRESENTED) The punch and die tooling apparatus as set forth in claim 1, wherein the horizontally extending ridge and the partially circumferential relief are formed by an overlapping upper and lower offset bores.
5. (PREVIOUSLY PRESENTED) The punch and die tooling apparatus as set forth in claim 4, wherein the lower bore is larger than the upper bore.
- 6-11. (CANCELED)